

Complete Summary

GUIDELINE TITLE

ACR Appropriateness Criteria™ for acute low back pain--radiculopathy.

BIBLIOGRAPHIC SOURCE(S)

Anderson RE, Drayer BP, Braffman B, Davis PC, Deck MD, Hasso AN, Johnson BA, Masaryk T, Pomeranz SJ, Seidenwurm D, Tanenbaum L, Masdeu JC. Acute low back pain--radiculopathy. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun; 215(Suppl): 479-85. [15 references]

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SCOPE

DISEASE/CONDITION(S)

Acute low back pain with or without radiculopathy

GUIDELINE CATEGORY

Diagnosis

CLINICAL SPECIALTY

Family Practice
 Internal Medicine
 Neurology
 Orthopedic Surgery
 Radiology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for acute low back pain with or without radiculopathy

TARGET POPULATION

Patients with acute low back pain with or without radiculopathy

INTERVENTIONS AND PRACTICES CONSIDERED

1. Plain lumbar x-rays
2. Isotope bone scan
3. Computed tomography
4. Myelogram
5. Myelogram/computed tomography
6. Magnetic resonance imaging:
 - Plain
 - With gadolinium

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of recent peer-reviewed medical journals, primarily using the National Library of Medicine's MEDLINE database. The developer identified and collected the major applicable articles.

NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus (Delphi Method)
Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed to reach agreement in the formulation of the Appropriateness Criteria. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty (80) percent agreement is considered a consensus. If consensus cannot be reached by this method, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria and the Chair of the ACR Board of Chancellors.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria™

Clinical Condition: Uncomplicated Low Back Pain

Variant 1: No red flags.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Plain lumbar x-rays	2	
Isotope bone scan	2	
Computed tomography	2	
Myelogram	2	
Myelogram/computed tomography	2	
Plain magnetic resonance imaging	2	
Magnetic resonance imaging plus gadolinium	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Clinical Condition: Uncomplicated Low Back Pain

Variant 2: Trauma, steroids, osteoporosis, over 70.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Plain lumbar x-rays	8	
Plain magnetic resonance imaging	5	
Magnetic resonance imaging plus gadolinium	4	
Isotope bone scan	4	
Computed tomography	4	
Myelogram	2	
Myelogram/computed tomography	2	
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1=Least appropriate 9=Most appropriate</p>		

Clinical Condition: Acute Low Back Pain

Variant 3: Suspicion of cancer, infection.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Plain magnetic resonance imaging	8	
Magnetic resonance imaging plus gadolinium	7	
Plain lumbar x-rays	7	
Isotope bone scan	5	
Computed tomography	4	
Myelogram	2	
Myelogram/computed tomography	2	
<p align="center"><u>Appropriateness Criteria Scale</u></p>		

1 2 3 4 5 6 7 8 9
1=Least appropriate 9=Most appropriate

Clinical Condition: Acute Low Back Pain

Variant 4: Radiculopathy.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Plain magnetic resonance imaging	8	
Myelogram/computed tomography	5	
Computed tomography	5	
Magnetic resonance imaging plus gadolinium	4	
Plain lumbar x-rays	4	
Isotope bone scan	2	
Myelogram	2	
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1=Least appropriate 9=Most appropriate</p>		

Clinical Condition: Acute Low Back Pain

Variant 5: Prior lumbar surgery.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Plain magnetic resonance imaging	7	
Magnetic resonance imaging plus gadolinium	7	Differentiate disc versus scar.
Computed tomography	5	To study fusion bone.
Isotope bone scan	5	Helps detect and localize painful pseudoarthrosis.

Plain lumbar x-rays	5	Flex/extension may be useful.
Myelogram/computed tomography	5	
Myelogram	2	
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1=Least appropriate 9=Most appropriate</p>		

Clinical Condition: Acute Low Back Pain

Variant 6: Cauda equina syndrome.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Plain magnetic resonance imaging	8	
Magnetic resonance imaging plus gadolinium	6	
Plain lumbar x-rays	5	
Computed tomography	4	
Myelogram/computed tomography	4	May be requested preoperatively.
Myelogram	2	
Isotope bone scan	2	
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1=Least appropriate 9=Most appropriate</p>		

Summary

Acute low back pain with or without radiculopathy [pain radiating down the leg(s)] is one of the most common health problems in the United States and is the leading cause of disability for persons younger than age 45. The cost of evaluation and treatment of acute low back pain (duration of less than three months) runs into billions of dollars annually, not including time lost from work.

It is now clear from previous studies that uncomplicated acute low back pain is a benign, self-limited condition that does not warrant any imaging studies. The vast majority of these patients are back to their usual activities in 30 days. The challenge for the clinician, therefore, is to distinguish that small segment within this large patient population that should be evaluated further because of suspicion of a more serious problem.

Indications of a more complicated status, often termed "red flags," include the following:

- recent significant trauma, or milder trauma at age older than 50
- unexplained weight loss
- unexplained fever
- immunosuppression
- history of cancer
- intravenous (IV) drug use
- prolonged use of corticosteroids, osteoporosis
- age older than 70

Plain X-rays

Plain x-rays are recommended when any of the above red flags are present. Normal plain lumbar x-rays may be sufficient for the initial evaluation of these red flags:

- recent significant trauma (at any age)
- prolonged steroid use
- osteoporosis
- age older than 70

The initial evaluation of the low back pain patient may require further imaging if red flags such as suspicion of cancer or infection are present.

Isotope Bone Scan

The role of the isotope bone scan in patients with acute low back pain has changed in recent years with the wide availability of magnetic resonance imaging and especially contrast-enhanced magnetic resonance imaging. The bone scan is a moderately sensitive test for detecting the presence of tumor, infection, or occult fractures of the vertebrae but not for specifying the diagnosis. The yield is very low in the presence of normal plain x-rays and laboratory studies, and highest in known malignancy. The test is contraindicated in pregnancy.

High-resolution isotope imaging including single-photon emission computed tomography may localize the source of pain in patients with articular facet osteoarthritis prior to therapeutic facet injection. Similar scans may be helpful in detecting and localizing the site of painful pseudoarthrosis in patients following lumbar spinal fusion.

Plain and contrast-enhanced magnetic resonance imaging has the ability to demonstrate inflammatory, neoplastic, and most traumatic lesions as well as show

anatomic detail not available on isotope studies. Gadolinium-enhanced magnetic resonance imaging reliably shows the presence and extent of spinal infection, and is useful in assessing therapy. Magnetic resonance imaging has therefore taken over the role of the isotope scan in many cases where the location of the lesion is known. The isotope scan remains invaluable when a survey of the entire skeleton is indicated.

Magnetic Resonance Imaging, Computed Tomography, Myelography, and Myelography with Computed Tomography

Uncomplicated acute low back pain (no red flags) warrants the use of none of the following imaging studies: magnetic resonance imaging, computed tomography, myelography, or myelography with computed tomography. Nonspecific lumbar disc abnormalities are common, and can be demonstrated readily on myelography, computed tomography, and magnetic resonance imaging even in asymptomatic patients.

The appropriate use of these imaging procedures is an important challenge that has been extensively addressed in the major reviews referenced herein (see the original guideline). For example, low back pain complicated by "red flags" suggesting infection or tumor may justify early use of computed tomography or magnetic resonance imaging even if plain x-rays are negative. The most common indication for the use of these imaging procedures, however, is the clinical setting of low back pain complicated by radiating pain (radiculopathy, sciatica) or cauda equina syndrome (bilateral leg weakness, urinary retention, saddle anesthesia), usually due to herniated disc and/or canal stenosis.

Magnetic Resonance Imaging

Magnetic resonance imaging of the lumbar spine has become the initial imaging modality of choice in complicated low back pain, displacing myelography and computed tomography in recent years. Sagittal images provide most of the information seen on myelography. Axial views match or exceed the value of computed tomography scans in most instances.

Computed Tomography

Computed tomography scans provide superior bone detail but are not quite as useful in depicting disc protrusions when compared with multiplanar magnetic resonance imaging.

Myelography/Computed Tomography

"Plain" myelography was the mainstay of lumbar herniated disc diagnosis for decades. It is now usually combined with postmyelography computed tomography. The combined study is as accurate in diagnosing disc herniation as plain computed tomography or magnetic resonance imaging, but suffers the disadvantage of requiring lumbar puncture and contrast injection.

Thermography, Discography, Computed Tomography, Discography

Expert panels agreed that these imaging modalities were either too nonspecific (thermography) or carried additional risk (discography) not warranted in view of the efficacy of other less invasive imaging procedures. When other studies fail to localize the cause of pain, discography may occasionally be helpful. Although the images often depict nonspecific aging or degenerative changes, the injection itself may reproduce the patient's pain, which may have diagnostic value.

CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate selection of radiologic exams for patients with acute low back pain with or without radiculopathy.

Subgroups Most Likely to Benefit:

Patients that should be evaluated further because of suspicion of a more serious problem include:

- recent significant trauma, or milder trauma age older than 50
- unexplained weight loss
- unexplained fever
- immunosuppression
- history of cancer
- intravenous (IV) drug use
- prolonged use of corticosteroids, osteoporosis
- age older than 70

POTENTIAL HARMS

The early indiscriminate use of expensive imaging procedures in this common clinical setting has caused large increases in worker's compensation costs and in some cases has led to the perception that computed tomography and magnetic resonance imaging of the lumbar spine is not worth the cost. The challenge for the clinician, therefore, is to distinguish that small segment within this large patient population that should be evaluated further because of suspicion of a more serious problem.

Subgroups Most Likely to be Harmed:

- Patients with uncomplicated acute low back pain that undergo unnecessary imaging studies.
- Patients with more complicated acute low back pain that fail to undergo necessary imaging studies.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Anderson RE, Drayer BP, Braffman B, Davis PC, Deck MD, Hasso AN, Johnson BA, Masaryk T, Pomeranz SJ, Seidenwurm D, Tanenbaum L, Masdeu JC. Acute low back pain--radiculopathy. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):479-85. [15 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1996 (revised 1999)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria™.

GUIDELINE COMMITTEE

ACR Appropriateness Criteria™ Committee, Expert Panel on Neurologic Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Names of Panel Members: Thomas Masaryk, MD; Burton P. Drayer, MD; Robert E. Anderson, MD; Bruce Braffman, MD; Patricia C. Davis, MD; Michael D. F. Deck, MD; Anton N. Hasso, MD; Blake A. Johnson, MD; Stephen J. Pomeranz, MD; David Seidenwurm, MD; Lawrence Tanenbaum, MD; Joseph C. Masdeu, MD, PhD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline. It is a revision of a previously issued version (Appropriateness criteria for acute low back pain-radiculopathy. Reston [VA]: American College of Radiology [ACR]; 1996. 7 p. [ACR Appropriateness Criteria™]).

The ACR Appropriateness Criteria™ are reviewed after five years, if not sooner, depending upon introduction of new and highly significant scientific evidence. The next review date for this topic is 2004.

GUIDELINE AVAILABILITY

Electronic copies: Available from the [American College of Radiology \(ACR\) Web site](#).

Print copies: Available from ACR, 1891 Preston White Drive, Reston, VA 20191.
Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on July 31, 2001. The information was verified by the guideline developer as of August 24, 2001.

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